Noise Reduction Strategies

Introduction

How was noise reduction addressed in the preferred alternative?

Throughout the state, WSDOT is working hard to manage traffic noise along highways in accordance with federal and state noise mitigation policies. In the preferred alternative for the SR 520 I-5 to Medina project, WSDOT committed to providing noise reduction features along the highway and identified other noise mitigation strategies in the SDEIS. The noise reduction features identified in the preferred alternative include a speed reduction to 45 mph on the Portage Bay Bridge, raising the profile of the West Approach, and implementation of innovative noise reduction methods along the corridor, including:

- Four-foot high traffic barriers with absorptive material from I-5 to the west approach of the floating bridge.
- Quieter concrete pavement along the SR 520 mainline the full length of the project, including the floating bridge.
- Acoustically absorptive materials around the Montlake lid portals.
- Bridge expansion joint encapsulation with absorptive material.

Since early 2000 when work on the SR 520 Bridge Replacement and HOV project EIS began, discussions have included the length and location of freeway lids. The preferred alternative includes two freeway lids—one at 10th Avenue and Delmar and one at the Montlake interchange. Though the primary objective for including these lids in the project is to reconnect adjacent neighborhood communities divided by the existing highway, the lids may also provide noise reduction benefits for those properties abutting the lid as well.

What comments were received?

Noise generated by users of SR 520 has been a major concern for people living along the highway for many years. During the review of the SDEIS, WSDOT received a number of comments that reiterated concerns about noise and requested the project include additional noise reduction strategies. A number of additional noise management features were added to the preferred alternative to respond to these concerns.

Addressing the problem

How did we identify possible solutions?

In addition to reviewing current, proven technologies, WSDOT investigated several innovative noise management methods being used or tested in other states and countries. In 2008, WSDOT hired an Expert Review Panel (ERP) of internationally renowned acousticians to evaluate potential noise

reduction methods for the project. In addition to noise walls, the ERP recommended considering:

- Quieter concrete pavement technologies.
- Acoustically absorptive materials.
- Quieter ventilation fans.
- Transparent/translucent barriers.
- Bridge expansion joint encapsulation.
- Traffic speed reductions.

WSDOT evaluated all of the ERP recommendations for feasibility and ultimately identified the noise management features included within the preferred alternative.

Recommendations

What did we consider?

WSDOT considered a host of noise management methods, including implementing several test projects to evaluate initial and long term effectiveness of various pavement types. These noise reduction options were evaluated for both reasonableness and feasibility, criteria required by FHWA for designation as noise mitigation and eligibility for federal funding.

Following this careful process, WSDOT recommends using the following design features to reduce noise:

Continue to follow the required FHWA/WSDOT process for consideration of noise mitigation. This process generally refers to use of proven technology such as noise walls and barriers, in specific, qualified locations. Many comments on the SDEIS expressed strong negative opinions about the aesthetic effects of noise walls, although a small number of comments expressed support of walls. Decisions on whether walls are included in the project are made according to the 2006 *WSDOT Traffic Noise Analysis and Abatement Policy and Procedures.* As part of this policy, WSDOT consults with affected first-line property owners to determine whether or not they want walls to be built at their property line. WSDOT traffic noise policy is based on the Federal Regulation 23CFR772.

Four-foot traffic barriers with absorptive material from I- 5 to the West Approach of the floating bridge. Four-foot traffic barriers can be considered noise mitigation at qualified locations, similar to noise walls. In addition, the use of absorptive materials is likely to reduce noise levels below that of standard concrete. The additional noise reduction from these traffic barriers may allow for shorter noise walls in some areas.

Quieter concrete pavement along the SR 520 mainline the full length of the project, including the floating bridge. Quieter concrete pavement tests in other states have shown promise for reduced noise. However, given the unproven and innovative nature of this method, WSDOT cannot guarantee specific noise reduction amounts or acoustic longevity of the noise performance until quieter concrete pavement has been tested and implemented in Washington.

As an additional concern, the cost to maintain pavement surface conditions is currently unknown. Still, WSDOT recognizes the benefits this treatment may provide based on tests performed in other states and therefore plans to implement quieter concrete pavement as part of the project and monitor the effectiveness.

Acoustically absorptive materials around the Montlake lid portals. Use of these materials near lid portals would have similar benefit to their use on traffic barriers. WSDOT is currently testing absorptive materials on several noise walls (on I-5, I-405 and SR 18) and around bridge joints on the Tacoma Narrows Bridge. Preliminary results have been promising, although some maintenance challenges have been identified.

Bridge expansion joint encapsulation to reduce noise transmission through bridge joints. A WSDOT study of bridge expansion joint encapsulation on the Tacoma Narrows Bridge is underway, including monitoring for effect and longevity. Preliminary results for longevity are promising, as are results from similar features on Interstate 90. The SR 520 project is an ideal corridor for implementing this innovative noise reduction strategy.

Speed limit reduction on the Portage Bay Bridge. Though speed limit reductions are a proven tool for reducing traffic noise, this strategy must be balanced with the desire to maintain relatively high speeds within some highway corridors. While most segments of SR 520 are considered a high speed corridor, WSDOT responded to concerns about maintaining the residential neighborhood character surrounding the Portage Bay Bridge by agreeing to reduce posted speed limits on the bridge from 60 to 45 mph. Vehicles traveling at highway speeds at the Montlake interchange will make a safe and logical transition through this lower speed area as they approach I-5.

Raising the profile on the west approach across Foster Island. Based on updated noise analysis in support of the Final Environmental Impact Statement, WSDOT identified that raising the profile of the west approach—as identified in the preferred alternative—reduced noise through the Arboretum.

Final TCT recommendation

The Technical Coordination Team recommended that WSDOT move forward with noise management strategies as identified in the SDEIS for the preferred alternative, including:

- Continue to follow the required FHWA/WSDOT process for considering noise mitigation.
- Four-foot high traffic barriers with acoustically absorptive material from I-5 to the west approach of the floating bridge.
- Quieter concrete pavement along the SR 520 mainline the full length of the project, including the floating bridge.
- Acoustically absorptive materials around lid portals.
- Bridge expansion joint encapsulation to reduce noise transmission through bridge joints.
- Speed limit reduction on the Portage Bay Bridge.